DR. COOK'S LECTURE ON DRY FARMING

Mr. Cnairman, Ladies and Gentlemen:

I want to say that there have been very few occasions in my life where I have had the honor of being as well received as since I have had the pleasure of coming to your county, last Sunday.

I am going to try and give you a few ideas of the outlook as to dry farming in your county. I am going to talk to you from the practical standpoint of a dry farmer as well as from the theoretical. I have been connected with agriculture for the last thirty years and have made a special study of it. Yet, on the other hand, I want to say this (as I said at the Dry Farming Congress at Spokane, Washington, a few months ago), that although we acknowledge we are in the twentieth century and know that to be a fact, yet we do not know anything about agriculture. It is only a few years ago that the Department of Agriculture, at Washington, D. C., published bulletins stating that it was impossible to raise a crop unless you had twenty inches of rainfall per annum. There are states in the Union, as Eastern Oregon, Washington, Utah and California, that are raising crops with as low a precipitation as nine and ten inches per annum.

My first experience in dry farming was in Eastern Oregon and Washington, and I have in my mind's eye a county called Sherman county, where they used to raise one crop in taree years; where it took them fifteen years to learn how properly to conserve moisture.

The term "dry farming" is a misnomer. We ought to recognize the fact that we cannot raise crops without moisture, but we have not yet learned with how little moisture we can mature a crop. However, we are learning every day; we are beginning to foresee the fact that in the so-called American Desert we raise the best crops of any part of the United States. We are also recognizing the fact that it takes less moisture to mature a crop in nigh altitudes than in low.

Let me state here that it is impossible for me on such short experience to make any hard and fast rules for your guidance, for the reason that I know hardly anything of your climatic conditions. The dry farmer as well as the irrigator must study his ground and the conditions affecting his portion of the country.

The successful dry farmer, the man who wants to be successful in dry farming, is a man who must perceive on the start that he must utilize his brains as well as his muscle. He must recognize that it is just as important to conduct farming upon business principles as it is to conduct a bank or become a successful merchant in town.

The large majority of farmers do not know why they plow deep or why they plow shallow or why they should cultivate. Tnere are a great many people who cannot recognize the fact that they can prepare soil and by means of deep plowing and thorough cultivation conserve moisture from one year to the next. You can make your soil a receptacle for moisture just the same as you can a bank for your funds. You put in $1,000 and check out $500 and there is still $500 subject to your check. It is the same way with holding moisture in your soil. We have to admit that you can plow deep—eight, nine or ten inches—and by proper methods of cultivation practically store up all the moisture which falls upon that ground.

I can take any of the soil out here, where it can be plowed—plow, harrow and cultivate it, after every heavy rain, from now until fall, and I want to say to you, that I do not care how hot it gets or how hard the wind blows, I can keep moisture in that soil so that at any time you scrape off the surface soil you will find moisture stored therein.

To do that, you have to recognize that in most of the semi-arid states the soil has been compacted for ages. To give you an idea of what I mean let me illustrate one of my experiences. On one of the demonstration farms I conducted in the central part of Wyoming, at a point some forty miles west of Casper, on the Chicago & Northwestern railway, an experiment along their line to show the possibilities of raising crops with almost the smallest amount of moisture that falls in the state of Wyoming, between nine and ten inches per annum. The right-of-way along the railroad was plowed up. There were twenty acres on one side and twenty acres on the other side. I had the ground plowed by the beginning of June and in October I went out to the farm on this open prairie and put in twenty acres of winter rye and twenty acres of winter wheat. Let me tell you the condition of tais plowed ground: The railroad people said, when they took down the right-of-way fence, that it would be put up on the outside of the plowed ground. When I went to drill this grain in, the fence had not been put up, so I got busy with the railroad people and they sent out a gang of Italians to put it up. It took these men a day to dig fifteen or eighteen post holes on the raw native prairie, the holes being large, three feet deep and of two feet diameter. When these posts were set they were set extra well. I got one of the best men to go out on the plowed ground and dig holes and I timed him. This man dug between fifty and sixty post holes of the same size as the others, in a day, because the soil had been opened up to the depth of eight or nine inches.

The plan that I am recommending for the conservation of moisture, to be practically assured of a maximum crop, is to plow the ground, when it is in the right physical condition, eight or nine inches deep—the deeper the better. Many men may be here who came from the East, and they will say that when you plow up the subsoil you won't get any crop for three or four years. That is true in the East. Our conditions are different.

I would suggest to the man who wants to conserve moisture that deep plowing and thorough cultivation of the soil will get results. The ground should be plowed eight or nine inches deep and should be harrowed at the same time it is plowed if it is possible to do so. As I stated in the beginning of this discourse we do not know anything about agriculture. Just think of it—we have been farming for twenty centuries and we have not awakened, until just a few years ago, to the fact that we should harrow the ground at the same time it is plowed.

A large majority of farmers, and I, myself, have been among the number, when going in the field to plow, will figure on handling a twenty to fifty acre tract and will put one or more teams on the ground to be plowed, after ALL the plowing has been done, to do the harrowing. Sometimes they are able to go ahead and plow without a break until it is all done; at other times a rain or snow storm intervenes and stops the work for some time. Then when we go on the ground again tnere would be clods of dirt as big as my head, save every drop of moisture. We had been done immediately after the plowing, day by day, the ground would have been like a sponge, and would have taken up any moistrue that might have fallen.

You can readily understand that when you plow your ground in the right physical condition, and the harrow comes right along behind, you can do more effective work than if the harrowing is left until two or three weeks afterward. You simply cannot get your ground in the same condition if it is harrowed any later. Here in this altitude, where you are farming under clear skies, for the conservation of moisture, you can realize how important it is that, just as soon as you turn soil over and expose it to the atmosphere, you must save every drop of moistrrue. We know if we have some wheat that happens to get wet we toss it up and dry it out by handling. Therefore, when plowing our ground, without immediate harrowing, we are leaving it loose; air gets into it and drys it out. Harrows are made now which can be attached to plows. Any farmer with ordinary ingenuity can make a harrow which can be attached to and follow the plow. If you are using a fourteen or sixteen inch plow, and tne horses have all they can do, a small horse or pony, at the side of the team, will drag a harrow large enough to handle the furrow you are turning over. If you cannot do that, then do as I had to do, and that is: The man would plow for a certain time and then hitch to the narrow before noon and before he goes to lunch, and every bit of land that has been plowed that forenoon is harrowed, and the same method is followed in the afternoon. After every HEAVY rain my land is harrowed—not after EVERY rain.

It has been recommended by some men doing the same kind of work as myself, tnat you should go onto your land after EVERY rain.

DON'T!

You will lose more moisture in this way than you can conserve. I mention after every HEAVY rain to get out and cultivate. Why? You all know that when you see a saucepan on the stove with the lid on it helps keep the steam in, and you would naturally conclude that if a crust formed over your land your moisture would be kept in.

Exactly the opposite.

Just as soon as a crust forms upon your soil, moisture comes up by capillarity. If the sun is intense your soil cracks open and the moisture comes up. If you will get onto your ground as soon as it is dry enough, so that dirt will not stick to your harrow teeth, harrow it all over, and you will break up this surface crust and have what is called a "soil mulch," and, as stated before, when you have that, you lose hardly any moisture.

One of the greatest mistakes the average dry farmer makes is to overseed. I met a gentleman yesterday who told me he was in the habit of putting in ninety to one hundred and twenty pounds—a bushel to two bushels—per acre, and he was somewhat astonished when I told him what I put in.

On the State Farm, on the 31st of August, last year, I sowed thirty-two pounds of winter wheat per acre; the weather was ideal; my grain stooled or tillered very much; the problem that has been bothering me all tne winter was how to thin it.

I believe I put on too much by twelve pounds per acre. Just think of twenty pounds of wheat per acre!

I want you to understand this fact, that when I speak of small amount of seed per acre, I mean first class, clean seed—the best is none too good for the farmer. We have to take into consideration that there are climatic conditions in the so-called arid and semi-arid states that I do not believe any of us know anything at all about.

We KNOW that the man who raises a successful crop of corn in the East cultivates, and the man who does not cultivate does not raise a good crop. I am recommending the cultivation of all kinds of grain; in fact, all of my crops are cultivated.

Many people have an idea that if you run a harrow or a weeder over growing grain, you will tear it out. Please take into consideration that the harrow which I recommend to use, or the weeder (which will be described later), are both made to get rid of weeds, and when your crop is up about five to six inches, and has a good root system, you may run your harrow with sharp teeth set at an angle of forty-five degrees, over your ground in any way. This gets rid of weeds, stimulates the growth of your crop and makes your ground so that it will hold moisture better and puts it in a more receptive condition for rain.

Two gentlemen were out to my farm, last year, asking questions about cultivation of crops, and they inquired whether it was a fact that you could run a machine over a growing crop and not ruin it. I ordered the man to hitch up to a weeder, a machine twelve feet wide, somewhat like a hay rake, having three rows of steel teeth about the size of one's little finger, and ran it over my winter rye, when it was knee-high to the horses, proving what could be done with a machine IN GROWING GRAIN WITHOUT INJURING IT.

The great trouble with the average farmer, be he dry farmer or irrigator "wet farmer," is that he does not perceive that if he will do INTENSIVE rather than EXTENSIVE work it will pay better. You people have an illustration of that right here. As I came back from a drive this morning I noticed some market gardens, and the reason the average market garden man wins out is because it is INTENSIVE work.

In one of my talks at Carpenter, southeast of Cheyenne, I told the farmers that, although I was not physically able to do the work myself, yet I believed I could go outside the schoolhouse and raise a bigger crop on ten acres than they did on twenty acres.

Government experts—men at the Department in Washington, D. C., have asserted, as stated before, that one cannot raise crops without at least twenty inches of rainfall per annum, and today they will not acknowledge altogether that the new movement in dry farming can be successfully done because they make excuses that you have had an exceptional season.

I have raised crops at Cheyenne, where the altitude is 6,000 feet and the precipitation less than yours, from the year 1905 until last year.

The precipitation comes there many times when you don't want it, and more often it doesn't come when you do want it, the average being 13.5 inches; the winters are dry and cold, and three years ago, with a precipitation for eight months—that is to say, I sowed some winter wheat in September, and including September and the following seven months the government records show that only one and one-half inches of moisture fell. Yet, in spite of all this, I threshed thirty-five bushels of winter wheat per acre, and the following year seventeen bushels per acre, from ground that was never touched in the meantime, being a volunteer crop due to a heavy rain which caught my crop just when I was harvesting the thirty-five bushels per acre the year before. Outside of the winter wheat I threshed thirty-four and one-half bushels of winter rye in addition.

Prof. B. C. Buffum, then at the head of the Agricultural Department of Wyoming University, went out to see my crop and examine it. That was in April. And when he got in the buggy to go away he said he was a very disappointed man. I asked him what was the matter and he said: "Your crop should be dead, but it is not." I mention this to show how little we really know of the possibilities of dry farming.

You have greater precipitation here than I have in Wyoming. You have better soil than I have been farming in Wyoming. We have all kinds of soil there and so have you here.

I do not believe, ladies and gentlemen, that you have the slightest conception, the slightest idea, of your possibilities adjacent to this town, and I want to tell you right now that if I did not think what I am saying to you I would not say so. I am not here to flatter you. I am here to tell you what my judgment dictates to me can be done in Yavapai county.

I am going to explain to you what I meant by saying that less moisture was required to mature a crop in a high altitude than is required in a low one. It is beyond question that all the lands in the arid and semi-arid states have what we might term a superabundance of fertility. The reason that is so is because the soil has not been leached out by heavy rains as they have been in the East. All this soil in the West is an accumulation of fertility for ages. Plants take their food in solution; that is to say, the water falls on the soil and dissolves chemicals in the soil, and the irrigation water also does this.

Soil that has fertility which is awaiting the water to dissolve it, like your soil, when the water dissolves that fertility, those chemicals which are in the soil, you have what we might term concentrated solution of plant food. Therefore, you can easily understand if you have concentrated this solution for your plants it is going to take less water than if you have soil that contains very little fertility.

Dr. John A. Wilstoe, president of the Utah Agricultural College, at Logan, Utah, has just written a book on dry farming, wherein he gives facts that where you have a soil that is highly fertilized, by means of cultivation it takes in some instances 50 per cent less moisture than where you have a crop in land that is not very fertile. Now, this is a very important fact.

There is another thing I am advocating in dry farming. I am telling you these things because I want some of you to try what I suggest. It is a well known fact to those familiar with the semi-arid states that the soil is deficient in humus, or organic matter, and there is no doubt in my mind, although I am recommending the raising of a maximum crop every year, that you can, right here, raise a crop every year. That is, not the same crop every year, but you can rotate. And what I am recommending is something that they have learned in the East and West, almost too late, I might say. In the beginning put in winter rye or some legume, say sweet clover, and plow it under green, so as to make your soil more retentive of moisture; make it so it will be easier to work.

In the East they have been recommending for some years past plowing under crops so the soil will produce better results. In Oregon and Washington, years ago, they had bunch grass that grew two feet high, with roots as big as my head, and they used to grow crops every year. Why?

Because when this was turned under it formed humus, or organic matter, making the soil more retentive of moisture.

Constant cropping has used this humus and when the rains come the land would not hold the moisture.

Your soils here, on account of stock running over them so long, do not contain a very great deal of humus.

I am perfectly certain in my own mind that, if you will recognize and follow what I am asserting, so that your soil, when you have plowed under crops, will hold moisture, you will be able to raise with the amount of moisture you have here, a crop every year. I do not see why you cannot raise the same crops that I have in Cheyenne, Wyoming. I have raised there successfully winter wheat, winter rye, several varieties of spring wheats, different varieties of oats, different varieties of barley, emmer (commonly called speltz), Canadian field peas, corn, milo maize, millet of different kinds, potatoes, half sugar beets for stock purposes, alfalfa and brome grass (Bromus Inermis).

You must seriously consider that it does not pay to get seeds raised in a lower altitude. You must recognize this fact, that in sowing seeds, whether you are irrigators or dry farmers, you should get seeds raised under like conditions in which you are going to use them, or those raised under worse conditions.

Another thing you have an advantage over me in Wyoming, and that is, as I understand it, you do not get very much wind. Since I have been here since last Sunday, the only wind that amounted to anything was the wind we had at Kirkland. Wind is one of the means whereby we lose our moisture, and I am sorry to say that Cheyenne is pretty notorious for having big winds.

The wind is a very important factor in the loss of moisture. I think if you had the same winds we have in Wyoming you would have practically a desert, as unless your moisture was well taken care of it would rapidly evaporate.

Another thing I want to tell you in connection with dry farming. A great many people have an idea that it is absolutely necessary that rain fall upon a crop while it is growing. If you have moisture stored up in your soil, enough of it to keep your crop growing, it does not really matter whether it rains upon it or not. I have proven tais myself and Dr. Widtsoe has also. It is simply a question of having available moisture. Now there are probably some people here in the audience who say this cannot be applied to this adjacent country. I have made it a point to inquire of everybody as to what has been done adjacent to Prescott, so far as dry farming is concerned, and I find that there are quite a number of people who have made quite a success without any particular method, which was very encouraging, because it showed that if people could raise crops by what I should call poor farming how much more sure are we to be successful when we apply proper methods.

I understand there are a great many farm products shipped into Prescott. Now, I would like to ask the question as to why it is those things could not be raised here?

There is nothing to prevent the farmer right around here from raising hogs.

There is nothing to prevent the farmer right around here from fattening cattle.

I am talking now from dry farming methods, and there is nothing to prevent the farmer from fattening sheep.

You can raise the necessary feed for fattening stock with right here, adjacent to Prescott.

I used to keep sheep, buying them in the mountains and fattening them upon beardless barley hay, cut in the stiff dough and alfalfa hay.

One ton of alfalfa, raised under natural precipitation, is equal to two tons raised by irrigation, as a feeding proposition.

You people can raise alfalfa here. I have seen no land since I have been here since last Sunday, on which I cannot raise alfalfa by dry farming methods, and what I have done and can do you also can do.

I have been into a section of country here where the farmers complain that the merchants of this town do not treat them right. I want to tell you that we had the same proposition in Cheyenne, Wyoming. Furthermore, I want to state tais, I do not come here to criticize you, but the success of dry farming is my success, and I want to see the dry farmer successful.

You may have the best mining country in the world and it will keep up a town to a certain extent, but the city that succeeds, the city that goes ahead, is the city that has an agricultural country tributary to it.

I would suggest that you people will see that the farmers who bring in their products here put up their crops properly. The average farmer is often too careless to look out for his own interests, and if you people can suggest and help him it will be for your mutual benefit. The great trouble with many farmers is that they do not grade their product. If they could recognize that uniform sized potatoes would sell better, it would help the merchant as well as them.

You have a magnificent opportunity here for a creamery. You can raise grains of all kinds and corn for silage for feeding cows, and can produce good cream. Some may say there will be no demand for the cream. At Cheyenne everybody said a creamery was no good, yet the creamery established there four or five years ago cannot get enough cream to supply the demand now.

Representative Mondell of Wyoming got a 320-acre homestead law passed and Senator Smoot got one for Utah. Mr. Mondell's bill applies to Wyoming and Montana, I think. I mention this for tne reason that I believe it would be well for the question to be taken up here so that you could say to new people coming into your state that they would be allowed to file upon a 320 acre homestead. I do not think 160 acres is sufficient for a farmer to make a living upon. Pope said: "Where grows, where grows it not, in vain our toil; we should blame the culture, not the soil."

Now, there is the whole problem in connection with dry farming: We can raise all kinds of crops if we utilize proper agricultural methods.

Your opportunities are, in my opinion, somewhat beyond comprehension. You have the soil and precipitation. Your official records of precipitation are far ahead of anything that they are in certain portions of Montana and Wyoming and Western Nebraska.

I would make another suggestion in connection with the welfare of your town and state, and that is that you should see that the people whom you get in here are people of some means. Unfortunately, in other states, there are a number of exploiters who have got people to come in without sufficient means.

It takes capital to farm. It does not take very much.

The money that kept me in Wyoming was made up from volunteer subscriptions, City Council, County Council and the Board of Trade. Then the Legislature made an appropriation of $5,000. That, in connection with some money that the railroads had put up, kept me, and the next appropriation that was made by the state was $10,000, which was two years ago, and the last appropriation that was made was for $10,000, by the last Legislature.

I just mention this because I believe if you people want to succeed in dry farming that it will pay you to have a demonstration farm conducted by a man who knows how and a man who has had the experience, and have tne demonstration farm adjacent to your town. The southeast portion of Wyoming has practically been settled up through the crops raised on the state demonstration farm, one and one-half miles from Cheyenne.

I think it is very important that you be able to show people what you can do. A part of my work has been, outside of conducting the demonstration work, to conduct farms in other parts of the state and lecture all over the state of Wyoming, and some of you know that Wyoming is quite like this country—one of magnificent distances. The work has been very encouraging.

When I first went there, stockmen had no use for me, as they thought I was going to run them out of the country. I told them that the time had arrived, in fact, had passed, that it was absolutely necessary for them to supplement their winter range with feed, and the stockmen have recognized that if the dry farmer will go in and raise feed that they are willing enough to buy it. Nearly a year ago, in the central part of Wyoming, there was half a million dollars sent out for feed, which could have been saved if dry farmers had been tnere and raised feed that they could have bought.

BORING FOR WATER

(From Thursday's Daily.)

Henry Braun, who is in the city from the Lucky Star mine in Mineral Point district, states that he will begin boring for water to reclaim an extensive farming area, and for the present will desist in mining operations. In tnat country, quite a land boom is going on and dry farming is actively under prosecution. Limited acreage at the Lucky Star experimented upon by Robert Burns establishes the fertility of the soil, and Mr. Braun enters the new vocation in an enthusiastic manner.

MINING ACTIVE

(From Friday's Daily.)

Gilbert Ferguson, who is in the city from the Logos mines country, near Mayer, states that there is more practical development than ever before in the district, and the general outlook is flattering for the making of several heavy producers. The recent discovery of rich copper ore on the Yavapai Metals ground, and the bonanza rating of the Blue Bell are inducements which attract capital to that field. The country is well located, and all zones that show any mineral indications are under ownership and development.

CONVOCATION OF EPISCOPALIANS CALLED

(From Tuesday's Daily)

The first annual convocation of the Episcopal church of Arizona, since its separation from New Mexico and the elevation of Bishop Atwood, will be held in Phoenix, Wednesday and Thursday of this week. The meetings will be in Trinity pro-cathedral, and will be attended by clerical and lay delegates from every parish in the Territory.

The opening service will be held Wednesday morning, at 10 o'clock, preceded by a procession of the clergy. The full choir of the cathedral will be present and the service, which will include the charge and address of the bishop, will be an impressive one. Following the opening service the convocation will organize and the delegates will be welcomed by Governor Sloan and Bishop Atwood.

A luncheon will be served in the parish house at noon and two hours occupied in sociability.

The Thursday afternoon session, beginning at 2 o'clock, will be in behalf of Sunday school work. Rev. J. Rockwood Jenkins of St. Luke's church, this city, will discuss the old-fashioned methods of Sunday school work and Rev. Arthur R. Moulton of Phoenix the new methods.

The Woman's Auxilliary of the district will meet in connection with the convention.

The following members of St. Luke's church of this city expect to be present: Rev. J. Rockwood Jenkins, Miss Jenkins, Hon. J. J. Hawkins, Hon. D. E. Parks, Mr. and Mrs. Allan Love, George Walker and Mrs. William Lloyd.

FULL CROPS ASSURED.

(From Tuesday's Daily)

Emmet Newton, who returned yesterday from a trip to Skull Valley, states that reports in circulation that the fruit and grain crops of that section had been destroyed, are erroneous. On the other hand, he says, the largest yield ever to tne credit of that fertile region is assured. Mr. Newton states that the dry farming implements which have recently been introduced at twelve different farms, are establishing their utility and through them a larger acreage and heavier production will be shown this year than by the old processes of cultivation. He is optimistic over tnat region in its crop prospects.

LOOKING OVER COUNTRY.

(From Tuesday's Daily)

Albert M. Hood and nephew, Fred Britton, who have been spending several weeks in Southern Arizona, arrived yesterday, and will remain for several days, looking over the land possibilities of this section, leaving this morning for the Verde Valley. They are from Concord, N. H., and will continue their investigations in New Mexico before returning home. Both state that ultimately they will make their home in the West, either in Arizona or New Mexico. They are pleased with the climatic conditions of this section.

ACTIVE PLACERS.

(From Tuesday's Daily)

George Ellert, mention of whom was made a few weeks ago, as passing through the city with a dry washing apparatus, to work placer ground near Ehrensberg, has returned from his camp and is en route to his home at Ozark, Kansas. He states that operations will soon cease, owing to the coming of warm weather, but that this fall he and brothers will prosecute diligent work. He is elated at the prospects ahead and limited dry washing has given excellent returns. Tne main difficulty is in stripping the cement formation to reach pay dirt.

HOMESEEKER DIES EN ROUTE

(From Thursday's Daily.)

A dispatch to the Des Moines News from La Crosse, Wis., under date of April 14, says:

"While on her way with her family to board a train for Prescott, Ariz., and in apparently perfect health, Mrs. George A. Hosmer, 48, was stricken with heart disease and expired. Mrs. Hosmer was the wife of a contractor who is about to construct a stave mill for the Brewing company in Prescott and the family intended to make that city their home until the work was completed."

BILL INTRODUCED TO REIMBURSE DR. DAY

WASHINGTON, D. C., April 18.—Delegate Cameron has introduced a bill for the relief of Dr. Warren E. Day to reimburse him for his services and medicine furnished in the treatment of a large number of cases of smallpox during the epidemic in 1884. This old claim has been approved by the department, but as there are no funds from which payment can be made, it has been brought before congress in the hope that Dr. Day can, in that way, be reimbursed for his outlay in service and supplies furnished during a period of emergency twenty-seven years ago.